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ABSTRACT

In this paper it is shown that one's conception of intelligence and its development profoundly affects the formulation of educational objectives. A mechanistic conception of intelligence leads to the definition of objectives as a collection of fragmented "cognitive skills" that have little to do with children's development of intelligence. A Piagetian conception, on the other hand, leads to attempts to develop children's intelligence as an organized whole. Intelligence is not something that we can educate separately by pasting it onto the child. It is rooted in the biological origins of a whole organism and develops as a highly interdependent whole. Our comprehension of reality, or the way in which we understand reality, precedes and largely determines how we react to it. Whatever specific objective we may define in education must, therefore, support and enhance qualities such as autonomy, so that intelligence can develop as a coherent, powerful whole. If we want this intelligence to develop into something powerful enough to overcome the natural human tendencies to see reality in terms of emotional needs and to accept easy ready--made answers, we must educate children to deal logically with reality itself. By compartmentalizing academic skills and separating them from the development of intelligence, schools too often produce passive students who wait to be told what to think next. (Author/JM)

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One Intelligence Indivisible*

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The title of my address is inspired by the theme of this conference, "One Child Indivisible." It gives me an opportunity to express my growing concern about recent trends in curriculum and evaluation towards dividing intelligence into parts to be educated and evaluated separately. These trends can be seen in fragmentary or compartmentalized definitions of cognitive objectives such as "information-processing skills," which imply that information processing can be taught separately from other cognitive skills. Such a view now seems to be buttressed by the pseudo-scientific respectability of psychometric tests which define so-called "competencies" in criterion-referenced tests. I am very distressed by the lists put around these "competencies" by program evaluators who use them to show quantitatively how much children have learned.

I would like to show in this paper that one's conception of intelligence and its development profoundly affects the formulation of educational objectives. A mechanistic conception of intelligence leads to the definition of objectives as a collection of fragmented "cognitive skills" that have little to do with children's development of intelligence. A Piagetian conception, on the other hand, leads to attempts to develop children's intelligence as an organized whole.

Most people now recognize the futility of trying to stuff children's heads with

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encyclopedic facts. In contrast from earlier to present, however, some educators seem to view the acquisition and use of concepts as a major aim. This view is especially clear in the recent preoccupation with the teaching of "cognitive skills" and "concepts."

The terms "skill" is justifiable when it refers to motor skills, such as walking, penmanship, swimming, skiing, and typing which humans come perfect with practice. However, I object strongly to the explanation that the nature of intellectual learning is so different from the learning of motor skills. Motor skills can be developed by repetition and practice, but intelligence surely cannot be developed in those ways. Consider the following skills I found in one item short list of educational objectives:

Classification skills

Inquiry skills

Attentional skills

Organizing skills

Information processing skills

Rule learning skills

Basic conceptual skills

Abstracting and evaluating skills.

If objectives are conceptualized in terms of such separate skills, it is no wonder that curriculum activities reflect the same fragmentation.

Closely related to the teaching of "cognitive skills" as the building of a collection of unrelated concepts such as the following:

Three, five, and two

Square and circles

Red and blue

Big and little

Before and after

Over and under

Up and down

In and out

Behind and in front of.

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It is true that one can often teach children to understand and produce these words correctly. However, one cannot say that children learn number, classes, series, or spatial or temporal relationships by learning these words. In fact, if one is successful in teaching children these words, it is usually because they already know the relationship. The teaching of "concepts" is generally equated with the teaching of words. While I have nothing against the teaching of words, I do object to attempts to teach relationships by teaching a collection of words that are believed to add up to intellectual development.

Let me turn now to a specific example. Recently, I received an announcement of a test called the "Cognitive Skills Assessment Battery" (Boehm and Slater, probably 1974). The stated purpose of this test is curriculum planning for young children. One of the two items shown as examples of a competency worth teaching is the following: The child is shown a picture of some toys and a couple of chairs, and is told, "Here are some toys. Listen carefully. Show me the dog in the box and the doll on the chair." I fail completely to see the importance of being able to find in a picture the dog that is in the box and the doll that is on the chair. It is not by learning to decipher pictures and other symbols on paper that children become more competent intellectually.

Piaget's notion of intelligence is very different from the view of intelligence as a collection of specific skills and concepts. When he taught a course on intelligence, he began by asking what is meant by "intelligence." Like most textbooks, he answered his own question by saying that, for him, "acts of intelligence" consist

[illegible] "application to new situations." In what sense is this true, although participation [illegible] in order to adapt to new situations, self-adaptation can occur naturally and, as a consequence, one aspect of testing of the assumption is that we ought to take [illegible] from that aspect of any sort of a hallucinogen. [illegible] the interpretation of the situation as [illegible] the assumption of a solution based on a bid to negotiate the situation. In other cases, our interpretation of reality, as it is [illegible] to explain [illegible] pressure and [illegible] achievement that we ought to do it. A well documented part of [illegible] is, therefore, the ability to predict reality, whereas it, as are [illegible] out of what is predictable. I think actual classroom use has produced [illegible] with children's ability to manipulate symbols. I would like to see [illegible] think this and [illegible] great children's ability to find and introduce [illegible] in an effort [illegible].

Let us [illegible] a classical Piagetian [illegible] to give an example of children's ability to [illegible] from reality. One [illegible] is interesting to us [illegible] "class inclusion." In this task, [illegible] are shown, for example, [illegible] and two yellow [illegible] as shown at Figure 1. In an [illegible] asked, "Are [illegible] are there?" an

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[illegible] Figure 1 of Class Task

[illegible] that the question can proceed with whatever answer does [illegible] reasoning. If he says, "Flowers," he is asked to show [illegible] flowers. The [illegible] then asks the child to show "[illegible] the blue flowers" and "[illegible] the yellow flowers." Only after having seen that the child demonstrates the words "yellow" "the flowers," "all the blue flowers," and "all the yellow flowers" and [illegible] is the following question: "Are there more blue flowers or more flowers?" [illegible] typically answers, "More blue ones," [illegible] the [illegible] asks, "Then what?" [illegible] typical answer is "Then yellow ones." In other words, the question as the [illegible] asks is "Are there more blue flowers or more flowers?" but the question the child "hears" is "Are there more blue

[illegible]

[illegible]

[illegible]

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knows how little remains of the knowledge acquired in school, five, ten, or twenty years after the end of secondary schools (p. 88)." This problem continues to be a very serious one, especially for compensatory education programs such as Head Start and Follow Through, whose perspective is limited to short-term adaptation to traditional schools.

The part of "development" in Figure 2 which does not overlap with "success in school" refers to the social, moral, and intellectual development which takes place outside the school or, sometimes, in spite of schools. It is sad to note that formal operations and a high level of moral development are not always found among university students. Piaget (1972, p. 51) observes that when we look at normal adults, we are forced to conclude that people who are masters of their reason are as rare as people who are truly moral.

If we take intellectual, social, and moral development as our long-range goal (the circle on the left in Figure 2), how can we define short-range objectives for early childhood education? Many of you have already heard me objecting to my earlier juxtaposed conceptualization that circulated most widely in the Handbook on Formative and Summative Evaluation (Kamii, 1971). In that book I delineated educational objectives by juxtaposing socio-emotional and cognitive objectives as shown in Figure 3. Within the socio-emotional realm, I further juxtaposed a

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Insert Figure 3 about here

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variety of objectives that I now prefer not to recall. Within the cognitive realm, too, I juxtaposed all the areas of knowledge studied by Piaget, e.g., classification, seriation, number, space, time, physical knowledge, etc. In retrospect, this was an empiricist-mechanistic assimilation of Piaget's theory and a distortion of it. I subsequently found out that, in the psychological reality of the child, classification,

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seriation, number, physical knowledge, etc., are related not in this neat, mutually exclusive way as shown in this itemized list, but, rather, in the messy, inseparable way shown in Figure 4.

Insert Figure 4 about here

My colleagues and I nowadays define educational objectives by putting these cognitive objectives within the context of socio-emotional objectives as shown in Figure 5. Since the child's social and moral development is beyond the scope of this paper, I would like to limit the rest of the discussion to the reason for

Insert Figure 5 about here

putting cognitive objectives in the following socio-emotional context:

Curiosity and initiative in pursuing curiosities

Alertness in putting things into relationships

Confidence to figure things out

Confidence to speak one's mind with conviction

Autonomy and ability to resist what does not make sense

Openness to consider different points of view.

This list may seem to some like a set of arbitrary values pulled out of what Kohlberg and Mayer (1972) call "a bag of virtues." While I agree that curiosity, alertness, confidence, and open-mindedness are highly valued in our culture, it is not for this reason that I consider them important educational objectives. My reason for valuing curiosity, alertness, etc., is that, without these, according to Piaget, human intelligence cannot develop. If intelligence develops as a whole by the child's own construction, then what makes this construction possible is the child's curiosity, interest, alertness, desire to communicate and exchange points of view,

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and a desire to make sense out of it all. Anyone who watches babies in light of The Origins of Intelligence (Piaget, 1936) and The Construction of Reality in the Child (Piaget, 1937) becomes convinced that curiosity, initiative, and alertness are what enable them to build all of their sensory-motor intelligence, which is truly a vast amount of knowledge. If curiosity, initiative, and alertness are present in young children, the rest of what are too often found in lists of cognitive objectives, such as "red" and "blue," are bound to be learned incidentally.

logico-mathematical knowledge is especially dependent on the child's initiative, since it develops by the child's own creation and coordination of relationships. logico-mathematical objectives are, therefore, better formulated in terms of encouraging the child's alertness than in terms of developing his "skills" such as "classification skills." The following example illustrates this point. A group of 4-year-olds went on a walk one day when there were many puddles on the ground. The teacher cautioned the children by saying, "Anyone who steps in a puddle is a wet noodle." The next day was very cold, and the puddles were half frozen. When the group went outside again, one of the children said, "Anyone who steps in the ice is a frozen noodle!" This remark was typical of this alert child, who came up with similar statements all the time. Alert children thus think of relationships that do not even occur to adults. The child's alertness is, therefore, a richer, more fruitful objective than a list of preconceived "skills." While structuring the observable data in his reality, this child was perfecting his classificatory scheme of "a puddle is to an icy puddle, what a wet noodle is to a frozen noodle."*

In conclusion, I would like to refer back to the examples given earlier of class

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*Those who are interested in an explanation of the rest of the objectives listed above are referred to Kamii and DeVries (in press).

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inclusion, the conservation of weight, children's notions of "sister," "mother," and "grandmother," their moral judgments about breaking things and telling lies, and Mr. Short and his associates. Intelligence is not something that we can educate separately by putting it into the child. It is rooted in the biological origins of a whole organism and develops as a highly interdependent whole. The way human, our conceptions of reality, or the way in which we understand reality, governs and largely determines how we react to it. Whatever specific objectives we may define in education must, therefore, support and enhance qualities such as autonomy, so that intelligence can develop as a coherent, powerful whole. If we want this intelligence to develop into something powerful enough to overcome the natural human tendencies to see reality in terms of emotional needs and to accept easy ready-made answers, we must educate children to deal logically with reality itself. By compartmentalizing academic skills and separating them from the development of intelligence, schools too often produce passive students who wait to be told what to think next. Evaluators have been busy evaluating all kinds of things, but what they have yet to evaluate is the conceptualization of objectives from the standpoint of how human intelligence develops.

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Figure 1. The arrangement of tanks
in the electrodialysis tank.
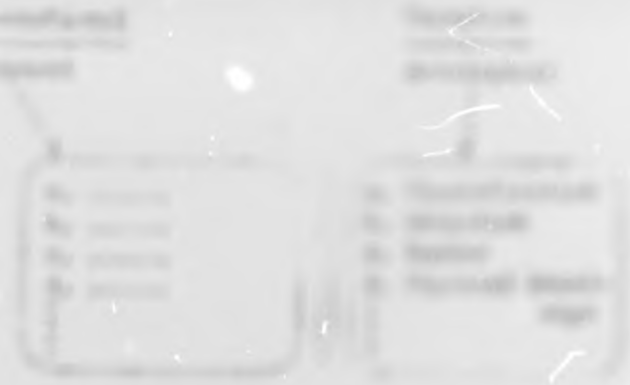
Figure 2. The relationship between two concepts or objects.